February 29, 2000
D. Ayres

MINOS PHYSICIST SHIFT LEADER AND DATA ACQUISITION COORDINATOR RESPONSIBILITIES AT SOUDAN

Far detector installation work at Soudan will occur in two 8-hour shifts per day, five days per week over a two-year period. Each shift's work will be managed by a Physicist Shift Leader (PSL) who coordinates the activities of visiting physicists and engineers with those of the Soudan Minecrew. PSLs are expected to be resident at Soudan for extended periods (at least 50% of the time for six months to one year) in order to maintain long-term continuity. In addition, a Data Acquisition Coordinator (DAQC) will cover at least one shift per day to oversee the commissioning and operation of the data acquisition system. (On-site DAQC coverage may not be needed until the first detector planes are brought into operation.) Therefore, in order to provide full coverage, we will need two to four PSLs and one or two DAQCs at any given time, depending on individual duty cycles at Soudan. PSLs and DAQCs report to the Level 2 Manager for Far Detector Installation, who maintains the long-term work plan and provides the interface to MINOS management at Fermilab. The DAQC reports to the PSL while on shift at Soudan.

A. PSL responsibilities are:

1. Develop and maintain the weekly work plan for installation activities, in coordination with the L2 Manager, the DAQC and the other PSL currently on duty.

2. Ensure that detector quality control procedures are being properly followed, and in particular that detector plane performance is certified before and after each plane is mounted on the support structure.

3. Coordinate the daily activities of the Soudan minecrew (through the Soudan Minecrew Supervisor), physicist shift workers, subsystem technical experts and data acquisition workers (through the DAQC).

4. Coordinate the activities of workers on the current shift with those of the preceding and following shifts. Day-shift and evening-shift PSLs will arrange to have sufficient overlap to ensure a smooth hand-over of work from one shift to the next.

5. Conduct a short planning meeting at the start of each shift. The purpose of the meeting is inform all workers of all activities which will be going on during the shift. Conflicts between activities will be resolved by the PSL at the meeting.

6. Identify and resolve conflicts which arise during the day.

7. Assist the Minecrew Supervisor in coordinating installation work with the DNR (State Park), the University of Minnesota, Fermilab Project Management, MINOS collaborating institutions and visitors to the Soudan experimental site (both physics-related and the general public).

8. Report weekly accomplishments and information which may affect future planning in writing to the L2 Manager. Ensure that detailed reports of on-site work are posted in appropriate logbooks on a daily basis.

B. DAQC responsibilities are:

1. Oversee the commissioning and operation of the data acquisition system at Soudan. On-site workers in this area include minecrew technicians to support electronics and computer hardware, electronics physicists and engineers, as well as software and computer system experts. Substantial software support will also be provided by off-site workers.

2. Work with the PSL to coordinate the installation and operation of the detector data acquisition system with other installation work at Soudan, including detector planes, electronic readout, the detector control system and computer systems.

3. Ensure the integrity of all data which is recorded for calibration and physics purposes. This includes (a) records of detector parameters associated with each data set, in the database and logbooks, and (b) the recording of calibration data needed to achieve the detector performance and physics goals of the experiment. (Neutrino beam events are not expected during the installation period, so physics data will consist of atmospheric neutrino and cosmic-ray events.) Optimize the amounts of time devoted to data taking, calibration and other special runs.

4. Coordinate the implementation at Soudan of the online software, the database and the online network systems for both detector control and diagnostic purposes.

5. Coordinate the implementation and maintenance of the interface between the online and offline software systems.

6. In preparation for neutrino beam running, coordinate data acquisition activities at Soudan with those at Fermilab, including the establishment of systems for far-detector data transmittal and the communication of information about the neutrino beam and the near detector.

7. Ensure the efficient operation of all on-site computer systems and coordinate the allocation of on-site computing resources among various tasks.

8. Provide periodic written reports to the L2 Manager, describing accomplishments, results and discussion of planning issues.

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FAR DETECTOR INSTALLATION TASKS NEEDING PHYSICIST EFFORT

Most tasks listed require both physicist and minecrew effort. Quantitative estimates of the effort levels required from each group will be made soon. Design work is needed for nearly all tasks listed, but the most urgent ones are listed separately in Section A. Establishing design specifications is almost entirely physicist work and is not a minecrew responsibility. Dates indicate when the need for physicist effort at Soudan begins.

A. Issues needing immediate attention

1. Detector plane survey procedures: design and testing
2. Detailed cabling plans at all levels: HV, electronics, flashers,..
3. Computer system planning: control room, counting house, surface bldg,..
4. Storage and checkout plans for ALL arriving materials and equipment
5. Detailed electronics grounding plan

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6. UPS plan: Needed for PMT HV system? For computers? Other equipment?
7. HV interlock system design (what is needed beyond software controls?)

B. Set up test equipment at Soudan and make it work (fall 2000)
(Mostly work for subsystem experts, with minecrew and shift physicist assistance. This work can start as soon as the Soudan 2 cavern mezzanine is ready, in the fall of 2000.)

1. Module mapper
2. Fiber optics cable tester
3. Other cable testers?
4. Module and light leak checker
5. MUX box checker
6. Wire source driver and readout

C. Set up equipment checkout and installation procedures (winter 2000-2001)
(Physicists set up procedures, train minecrew to carry them out, and monitor results over entire installation period. Mostly work for shift physicists.)

1. Steel plates
2. Scintillator modules
3. MUX boxes (with PMTs), including installation of VFBs
4. Clear fiber ribbon cables
5. Electronics crates, cards, components
6. Light flasher system components
7. Assemble and cable equipment in relay racks (front-end, VME, HV, aux)
8. Detector control system components
9. Electrical power cutoff fire protection system
10. Cooling system operation and monitoring
11. High voltage system components
12. Magnet coil and power supply system components
13. Magnetic monitoring system components

D. Detector plane installation (spring 2001)
(Procedures set up by physicist subsystem experts, carried out by minecrew, monitored and assisted by shift physicists.)

1. Checkout of planes on strongback (light leaks, fiber continuity)
2. Checkout of planes after mounting (wire source, light flasher)
3. Fiber cabling to MUX boxes
4. MUX box and electronics rack cabling and turnon
5. Plane operation after checkout (100% shift physicist)

E. As-installed detector parameters and survey (spring 2001)
(Procedures set up by subsystem experts, carried out by minecrew, monitored and assisted by shift physicists.)

1. Steel plate data measurement, database entry
2. Scintillator module checkout data measurement, database entry
3. Magnetic calibration and monitoring data measurement and database entry
4. Assist with setup of global cavern survey system
5. Survey detector support structure, especially rails
6. Survey module location on steel planes
7. Survey plane location and flatness after mounting
8. Survey locations of all planes as installation proceeds

F. Computer systems (spring 2001)
(These are mostly a one-time physicist setup and checkout jobs, with technical assistance from the minecrew. System manager arrangements in the long term are still to be determined. This task involves both subsystem experts and shift physicists.)

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1. PC networking and LAN
2. Individual PC systems
3. Computer security systems
4. Computer system maintenance, backup protocols
5. Counting House facilities
6. Underground control room facilities
7. Other places for terminals and worker seats underground
8. Surface bldg facilities
9. Computer UPS systems
10. Network connections to surface bldg, local housing, Fermilab, GPS,..

G. Software (spring 2001)
(This will be an ongoing job for both shift physicists and subsystem experts.)

1. Setup and maintenance of database entry software
2. Off-site remote control and interlock systems, protocols
3. Online diagnostics (mostly subsystem experts):
   a. wire source data analysis and display
   b. cosmic muon tracking and light yield data
   c. cosmic muon strip location survey and calibration
   d. electronics channel calibration and diagnostics
   e. PMT-MUX diagnostics (light flasher, noise,...)
   f. HV control and interlocks
   g. data quality monitoring
4. Data distribution to offline analysis
5. React to feedback from diagnostics and offline analysis results

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